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# ANNOTATED BIBLIOGRAPHY ON IRON ORE - 1991

Prepared by the UNCTAD secretariat

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CONTENTS


| | | Paragraphs |
|---|---|---|
| Introduction | | 1-2 |
| PART I. | RELEVANT ACTIVITIES AND STUDIES OF INTERNATIONAL ORGANIZATIONS | |
| 1. | UNCTAD | 3-18 |
| 1.1 | Commodities Division | 3-5 |
| 1.2 | Division for Data Management | 6-8 |
| 1.3 | Shipping Division | 9-17 |
| 1.4 | International Trade Programmes | 18 |
| 2. | OTHER UNITED NATIONS ORGANIZATIONS OR SPECIALIZED AGENCIES | 19-37 |
| 2.1 | Economic Commission for Africa (ECA) | 19 |
| 2.2 | Economic Commission for Europe (ECE) | 20-24 |
| 2.3 | Economic Commission for Latin America and Caribbean (ECLAC) | 25 |
| 2.4 | Economic and Social Commission for Asia and the Pacific (ESCAP) | 26-28 |
| 2.5 | United Nations Division of Natural Resources and Energy, New York | 29 |
| 2.6 | United Nations Centre on Transnational Corporations (UNCTC) | 30 |
| 2.7 | United Nations Development Programme (UNDP) | 31 |
| 2.8 | United Nations Industrial Development Organization (UNIDO) | 32-33 |
| 2.9 | International Trade Centre UNCTAD/GATT (ITC) | 34 |
| 2.10 | International Labour Organization (ILO) | 35-37 |
| 3. | OTHER INTERNATIONAL ORGANIZATIONS | 38-65 |
| 3.1 | World Bank | 38-41 |
| 3.2 | General Agreement on Tariffs and Trade (GATT) | 42 |
| 3.3 | Organization for Economic Co-operation and Development (OECD) | 43-45 |

3.4 Commission of the European Economic Community (EEC)..... 46-49

3.5 European Free Trade Association - EFTA ..... 50

3.6 Commonwealth Secretariat ..... 51

3.7 International Iron and Steel Institute (IISI)..... 52-55

3.8 Latin American Iron and Steel Institute (ILAFA) ..... 56-60

3.9 South-East Asia Iron and Steel Institute (SEASI)..... 61-62

3.10 Arab Iron and Steel Union (AISU) ..... 63-64

3.11 American Iron Ore Association (AIOA) ..... 65

PART II. RELEVANT STUDIES AND PUBLICATIONS COMMUNICATED BY GOVERNMENTS

Canada ..... 66
Chile ..... 67-74
Germany ..... 75
Ghana ..... 76-77
Mexico ..... 78-81
Panama ..... 82
Philippines ..... 83
Sweden ..... 84-87
United States ..... 88
Uruguay ..... 89

PART III. SUMMARIES ON SPECIFIC TOPICS

A. Iron ore mining capacity and investments ..... 90-93

B. Evolution of demand and supply of iron ore or steel..... 94-96

Annex

Directory of relevant international organizations

## INTRODUCTION

1. This annotated bibliography contains summaries of relevant studies and/or information about the activities carried out by UNCTAD and other international organizations, as well as in individual countries, in the field of iron ore or related issues considered to be of interest to iron ore producers and consumers.

2. The present document was prepared in response to the wish of the Intergovernmental Group of Experts on Iron Ore. The Group decided that the "Annotated bibliography on iron ore" should be regularly updated and that this subject should be maintained as a regular item on its agenda. For the preparation of this 1991 version of the bibliography, the UNCTAD secretariat requested all States members of UNCTAD, as well as concerned international organizations, to provide copies of recent studies and any other relevant information on iron ore, iron and steel matters. The information provided herewith is based on the replies received as of 25 July 1991, and complemented with information and studies available in the UNCTAD secretariat.

## SURVEY OF THE QUALITY AND USEFULNESS OF UNCTAD PUBLICATIONS AND OF THEIR END-USERS

The UNCTAD secretariat, in the context of its programme evaluation activities and in response to intergovernmental requests, is seeking the opinions of end-users in order to have basic data for assessing the quality, usefulness and effectiveness of *inter alia* its research reports and publications. As the success of such an exercise is critically dependent on an adequate rate of response we should appreciate it if you would take time to answer the questions below and submit any other comments that you may have concerning the current document.

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Extremely useful ( ); Very useful ( ); Useful ( ); Marginally useful ( ); Not at all ( ).

**Its quality, in terms of the following aspects** *(tick one box in each case)*:

| | *Outstanding* | *Excellent* | *Good* | *Adequate* | *Poor* |
|---|---|---|---|---|---|
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| Originality of ideas | ( ) | ( ) | ( ) | ( ) | ( ) |
| Wealth of information | ( ) | ( ) | ( ) | ( ) | ( ) |
| Up-to-date information | ( ) | ( ) | ( ) | ( ) | ( ) |
| Technical accuracy | ( ) | ( ) | ( ) | ( ) | ( ) |
| Quality of analysis, including objectivity | ( ) | ( ) | ( ) | ( ) | ( ) |
| Validity of conclusions | ( ) | ( ) | ( ) | ( ) | ( ) |
| Clarity of recommendations | ( ) | ( ) | ( ) | ( ) | ( ) |
| Comprehensiveness of coverage | ( ) | ( ) | ( ) | ( ) | ( ) |

6. **Other observations** *(if any)* . . . . . .

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*Your answers are for internal use and will be kept confidential.* Thank you for your co-operation.

Please forward the questionnaire to : PROGRAMME CO-ORDINATION AND EVALUATION UNIT
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UNITED NATIONS CONFERENCE ON TRADE AND DEVELOPMENT
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## Part I

## RELEVANT ACTIVITIES AND STUDIES OF INTERNATIONAL ORGANIZATIONS

1. UNCTAD

1.1 Commodities Division

3. The main UNCTAD activity on iron ore is linked to the work of the Intergovernmental Group of Experts on Iron Ore. This Group is composed of representatives of Governments and industry from both iron ore producing and consuming countries, as well as from relevant international organizations. Its main purpose is to provide a forum for a regular producer-consumer dialogue on iron ore matters. Participation is open to representatives from all UNCTAD member countries and the participation of industry is highly encouraged. The annual sessions of the Expert Group are held for three days, normally in October at the Palais des Nation in Geneva.

1.1.1 Review of the current market situation and outlook for iron ore - 1991
TD/B/C.1/IRON ORE/8, Geneva, August 1991
For general distribution. Issued in the six United Nations official languages (Arabic, Chinese, English, French, Russian and Spanish).

4. This report describes developments which took place in the world iron ore market during the previous year and the first half of the current year. It is used as a background document to facilitate a regular exchange of views between both iron ore producing and consuming countries involved in the work of UNCTAD's Intergovernmental Group of Experts on Iron Ore. Featured are recent developments influencing demand for iron ore such as the production of steel, pig iron and sponge iron (DRI), the ferrous scrap market and iron ore stock movements. The supply capacity at the regional and global levels, as well as the financing and investments plans of the iron ore mining industry, are also dealt with. The report examines international trade issues relating to the volume and value of international trade, prices, freight rates and transportation costs for iron ore. Technological and environmental issues are also addressed. The last section deals with the outlook for the iron ore market.

1.1.2 Annotated bibliography on iron ore - 1991
TD/B/C.1/IRON ORE/9, Geneva, August 1991
For general distribution. Issued in all United Nations official languages.

5. The present bibliography is prepared annually for submission to UNCTAD's Intergovernmental Group of Experts on Iron Ore. Its main purpose is to inform iron ore producers and consumers about studies and activities currently undertaken worldwide by international institutions and in individual countries.

1.2 Division for Data Management

1.2.1 Iron ore statistics 1981-1990
TD/B/C.1/IRON ORE/7, Geneva, August 1991
For general distribution. Issued in the six United Nations official languages.

6. This statistical compendium is issued under the UNCTAD regular work programme for iron ore, and has appeared annually since 1984. This compendium, which complements the review of the market situation and outlook,

is published with a view to improving market transparency. The world statistical series cover the last 10 years and include data at the country level for: production of iron ore in natural weight and in estimated iron content, and for certain countries by product; production and exports of pellets; production of sinter; volume of exports and imports of iron ore; a network of iron ore exports by major destinations, and imports by origin/destination for the major importing markets; value of exports and imports of iron ore in United States dollars; apparent and actual consumption of iron ore, as well as actual consumption by product; stocks of producing and consuming countries by product; production of pig iron and sponge iron; consumption, imports and exports of ferrous metallics; and crude steel production.

1.2.2 Trust fund project on iron ore information.

7. Following the suspension of activities of the Association of Iron Ore Exporting Countries (APEF) as of 1 June 1989, the Governments of certain countries, namely Australia, Canada, India, United States and Venezuela, and the Commission of the European Economic Community, decided to establish a trust fund project on iron ore information administrated by UNCTAD. The purpose was to continue the collection and dissemination of data relating to iron ore formely undertaken by APEF. This project is financed by voluntary contributions from interested governments and by the revenues from the sales of publications. The trust fund project, initially created until the end of 1990, has been extended, and donor Governments will decide about its future by the end of 1991. The following publications were issued under this project:

- Iron Ore Statistics (July 1989; October 1989; June 1990; October 1990 and July 1991)
- Market Report on Iron Ore (March 1990 and March 1991)

1.2.3 Monthly Commodity Price Bulletin - 1991
Annual subscription 03600P - (ISSN 0251-6438)

8. This bulletin is issued monthly. It is available for an annual subscription which also covers the occasional publication of a supplement. The explanatory notes, descriptions and sources are published in English, French and Spanish. The bulletin contains historical series of monthly, quarterly and annual average prices for the current and past three years for all major commodities including minerals, ores and metals, of which iron ore.

1.3 Shipping Division

9. Under the work programme of UNCTAD's Committee on Shipping, a number of specialized reports, technical assistance projects and training activities, which might be of interest to those involved in the seaborne trade of iron ore, are carried out annually.

1.3.1 Review of Maritime Transport 1989
TD/B/C.4/334, Sales No. E.90.II. D7, Geneva, September 1990
Available in all six official languages.

10. This annual report is usually issued in September and examines developments in international seaborne trade that occurred during the previous year. It covers world developments relating to the world fleet, shipbuilding, ports, freight markets including for iron ore, multimodal transport, technological issues, as well as other major international events such as the

status of negotiations for the different United Nations Conventions on: a Code of Conduct for Liner Conferences; Conditions for Registration of Ships; International Multimodal Transport of Goods, etc.

1.3.2 Other reports

11. Other reports issued in 1990, which might be of particular interest to iron ore producers and consumers are:

- Evaluation of the technical co-operation programme in the field of maritime and multimodal transport
  TD/B/C.4/331 and TD/B/C.4/331/Add.1, Geneva, April 1990
  For general distribution in all six languages.

12. This document presents the general aspects of the current UNCTAD programme in this field, its objectives and results, as well as a list of projects and training courses carried out during the period 1980-1988.

- Protection of shipper's interests: Experience in freight rates negotiations.
  TD/B/C.4/332, Geneva, April 1990
  For general distribution in all United Nations official languages.

13. This report briefly examines the historical evolution of relations between shippers' organizations and liner conferences and gives an account of procedures relating to current practices in freight rate negotiations.

- Charter parties : A comparative analysis
  TD/B/C.4/ISL/55, Geneva, June 1990
  For general distribution in all United Nations official languages.

14. This report was prepared following the recommendation of UNCTAD's Working Group on International Shipping Legislation. It identifies a number of clauses, both in time and voyage charter parties, capable of harmonization and/or improvement.

- Development and improvement of ports
  TD/B/C.4/AC.7/11, Geneva, July 1990
  For general distribution in all United Nations official languages.

15. This report presents guidelines for port managers on the use of computers. It was prepared for the Ad Hoc Intergovernmental Group of Port Experts with a view to advising senior and especially middle port managers in developing countries on how to make the best use of modern information technology.

- Port development: The role of UNCTAD
  TD/B/C.4/AC.7/7, Geneva, August 1990
  For general distribution in all United Nations official languages.

16. This report reviews the practical problems relating to the administration of ports, its operations and possibilities for improvements. It also provides information about training, technical co-operation, and the future programme of the UNCTAD secretariat in this area.

- The establishment of trans-shipment facilities in developing countries TD/B/C.4/A.C.7/10, Geneva, August 1990
  For general distribution in all United Nations official languages.

17. This study examines current trans-shipment activities and problems, in particular those of an economic nature. It also reviews the development of trans-shipment container traffic in the main regions of the world and the prospects for the development of trans-shipment facilities and activities in developing countries.

1.4 International Trade Programmes

1.4.1 Structural changes in the iron and steel industry during the 1980s, with particular reference to developing countries
UNCTAD/ITP/52, Geneva, November 1990
For general distribution in English only.

18. The study analyses the major developments which have reshaped the iron and steel industry during the last decade, in particular the changes in trading positions and production shares resulting from shifts in comparative advantage. It examines structural adjustment and protectionism in developed market-economy countries, and their impact on the prospects for the iron and steel industry of developing countries.

2. OTHER UNITED NATIONS ORGANIZATIONS OR SPECIALIZED AGENCIES

2.1 Economic Commission for Africa - ECA

2.1.1 The iron ore industry in Africa during the 1980s and prospects for the 1990s
ECA/NRD/FRCDUMRA/3, Addis Ababa, February 1991
Limited distribution in English and French.

19. This study was prepared jointly by the Division of Natural Resources of ECA and the Commodities Division of UNCTAD. It was presented at the Fourth Regional Conference on Mineral Resources Development and Utilization in Africa, held in Ouagadougou in March 1991. The study makes an assessment of the current situation of the world iron ore market and the position of African iron ore producers. The salient features which took place during the 1980s are examined and possible prospects for the 1990s identified. Suggestions are made for greater diversification and optimization of available natural, human and financial resources, as well as for the strengthening of regional co-operation for the development of the African iron ore industry in the coming years.

2.2 Economic Commission for Europe - ECE

20. The Geneva-based United Nations Economic Commission for Europe, within the framework of its Working Party on Steel, organizes meetings, seminars, and study tours and also undertakes studies in the field of iron and steel. From June 1990 to June 1991, its main studies and activities were:

2.2.1 The Steel Market in 1989
ECE/STEEL/70, Sales No. E.90.II.E.34, Geneva, October 1990.
Available in English, French and Russian.

21. This publication covers steel developments in 1989. It presents an annual review of the steel market and the main factors conditioning the supply of and demand for steel products in Eastern and Western Europe, North and South America, Japan, Australia, China and most of the emerging steel-producing countries of the Middle and Far East. It describes the past evolution and prospects of the main macro-economic trends, the main steel-consuming sectors, the steel trade, the main raw materials such as iron ore, scrap, coal, etc. The 1990 edition of this report will be published in October 1991.

2.2.2 The Recuperation and Economic Utilization of By-Products of the Iron and Steel Industry
ECE/STEEL/68, Sales No. E.90.II.E.13, Geneva, May 1990
Available in English, French and Russian.

22. This study, based on national monographs and on material received from specialized institutes and organizations, presents the current situation and the major trends in the recuperation and utilization of by-products of the iron and steel industry. The study covers the main trends in the recovery of secondary energy sources of the iron and steel industry and describes some technological processes aimed at a better utilization of this type of energy. It considers the impact of technological and economic trends on the recuperation and economic utilization of by-products and the recovery of secondary energy resources of the iron and steel industry.

2.2.3 Other ECE activities

23. ECE organized a study tour of the French iron and steel industry from 26 May to 1 June 1991. Participants visited the main iron and steel plants of the northern and eastern parts of France, producing both alloyed and non-alloyed steels, as well as plants manufacturing flat and long products, coated and non-coated, and large welded tubes. Future study tours are planned for 1992 in Yugoslavia, and 1993 in Bulgaria.

24. In 1990, the seminar "Steel 90: The Technical and Economic Aspects of the Manufacture and Application of Coated Steel Products" was held at Genoa, Italy from 7 to 11 May 1990, during which 70 technical papers on this matter were presented. The next EEC seminar will focus on "Producers' and Users' Metallurgical Requirements in the Welding of Steel Products" and will take place in Kiev, Ukranian SSR, from 16 to 20 September 1991.

2.3 Economic Commission for Latin America and the Caribbean - ECLAC

25. ECLAC has not carried out any recent work in the field of iron ore or steel. During the second half of 1991, however, national monographs on the mining activities of 14 Latin American countries will be issued. For iron ore producing countries, it is naturally expected that an analysis of their iron ore mining industry will be included in these monographs.

2.4 Economic and Social Commission for Asia and the Pacific-ESCAP

26. In 1990 ESCAP published the following booklets presenting the distribution of mineral deposits, including iron ore:

2.4.1 Atlas of Mineral Resources of the ESCAP region, Volume 6, Viet Nam
ST/ESCAP/831, Sales No. E.90.II.F.10, Bangkok, 1990

27. This document is an explanatory brochure prepared in co-operation with the General Department of Mines and Geology of Viet Nam. It presents extensive new information concerning mineral resources of Viet Nam, including a geological map of the Thach Khe and the Quy Xa iron ore deposits.

2.4.2 Atlas of Mineral Resources of the ESCAP region Volume 7, Lao People's Democratic Republic
ST/ESCAP/89, Sales No. E.90.II.F.14, Bangkok, 1990

28. This publication presents an updated inventory of geology and mineral resources found in the above-mentioned country. It consists of an explanatory

brochure and two atlas sheets: a geological map and a mineral resources map. The two best known iron ore deposits with economic potential are the Pha Lek and Phou Nhouan in the north/centre of the country.

2.5 United Nations Division of Natural Resources and Energy, New York

29. No particular publication on iron ore or related issues was prepared by this Division in 1990.

2.6 United Nations Centre on Transnational Corporations - UNCTC

30. The latest publications by UNCTC on mining and iron ore metals were issued in 1981 and 1983. Since then, no other publication on this subject has been published.

2.7 United Nations Development Programme - UNDP

31. In 1990 no particular activity on iron ore was carried out by UNDP.

2.8 United Nations Industrial Development Organization - UNIDO

32. No specific activities or studies were undertaken by UNIDO in the field of iron ore in 1990, except for the technical assistance provided by UNIDO to the iron and steel industries of developing countries.

2.8.1 Industry and Development: Global Report 1990/91
Sales No. F-355N, Vienna, 1990
Available in English, French and Spanish

33. UNIDO's global report presents an overview of the world industrial economy, providing an account of industrial performance in 10 regions of the world, and a survey of 13 selected manufacturing industries, including the iron and steel and the forging industries. The review of iron and steelmaking examines the problems of developing and developed countries as regards production and capacity utilisation. It also examines the new ironmaking technologies, in particular as regards energy and environmental considerations.

2.9 International Trade Centre UNCTAD/GATT - ITC

34. ITC did not undertake any studies or activities relating to iron ore in 1990.

2.10 International Labour Office - ILO

35. The twelfth session of ILO's Iron and Steel Committee will be held in April 1992, and the two reports which will be submitted to the session are currently under preparation and might be published by the end of 1991. The General Report will focus on several social and labour issues relating to the iron and steel industry, including the role of legislation and collective bargaining in coping with the social and labour consequences of structural change in the iron and steel industry. The second report will address the questions of Vocational training, retraining and skill development in the iron and steel industry, and the role of governments, employers' and workers' organisations.

2.10.1 Note on the proceedings - Fifth Tripartite Technical Meeting for Mines other than Coal Mines
TTM/MOC/5/1990/120, Sales No. ISBN 92-2-107543-5, Geneva, November 1990

36. Following the holding of the Fifth Tripartite Technical Meeting for Mines other than Coal Mines, held in 1990, details of which were included in the 1990 annotated bibliography, the Note on the proceedings of this meeting was published in November 1990.

2.10.2 Iron and steel producers: fourteen of the smaller players
SAP 2.27/WP.41, ISBN 92-2-107893-0, Geneva, April 1991
Limited distribution.

37. This working paper was prepared within the framework of the ILO's Sectoral Activities Programme. The report reviews recent developments in the iron and steel industry in 14 developing nations. It examines the role of the state in the establishment of large-scale iron and steel industry and some typical problems which hamper the operation of steelworks in these countries such as limited and unstable internal markets, deficient transport and social infrastructure, low capacity utilisation, etc. The recent trend towards the privatisation of state steel enterprises and the setting-up of joint ventures is also analysed.

## 3. OTHER INTERNATIONAL ORGANIZATIONS

### 3.1 World Bank

38. Publications issued by the World Bank from June 1990 to June 1991 containing issues related to iron ore, iron and steel were the following:

3.1.1 Price Prospects for Major Primary Commodities
Report No. 814/90, Volume I, Washington, December 1990
Restricted distribution.

39. This report is a compilation of studies which review the market prospects for major primary commodities exported by developing countries, including iron ore and steel. The prospects are used in forecasting the balance of payments of countries that borrow from the World Bank and in appraising investment projects that include these commodities as inputs or outputs. Forecasts are discussed by commodity and a set of tables provides historical and forecast values for production, consumption, exports and imports.

3.1.2 Quarterly Review of Commodities Markets, Washington, March 1991
Restricted distribution.

40. This paper is an office memorandum for external circulation prepared by the International Trade Division of the World Bank/International Finance Corporation. It briefly reviews market developments, including those for iron ore and steel, and presents a price index based on 33 non-fuel commodities.

3.1.3 Half Yearly Revision of Commodity Price Forecasts, Washington, July 1991
Restricted distribution.

41. This memorandum for external distribution presents a set of tables of the latest forecasts of primary commodity prices, including iron ore. Projections cover the period from 1991 to 2005.

### 3.2 General Agreement on Tariffs and Trade - GATT

42. The GATT secretariat has not published any specific studies on iron ore, iron and steel. However, the Uruguay Round negotiations on natural resource-based products, which include iron and steel in the list of

additional products, take place within the framework of market-access negotiations. Their objective is to liberalize trade in those products by reducing or eliminating tariffs and tariff escalation and non-tariff measures.

3.3 Organisation for Economic Co-operation and Development - OECD

43. The OECD, through its Steel Committee, publishes regularly two annual reports in the iron and steel field, namely:

3.3.1 The Steel Market in 1990 and the Outlook for 1991
Sales No. ISBN 92-64-13535-9, Paris, July 1991
Available in English and French.

44. This report is normally issued by July every year. It provides a detailed analysis of the steel market, pointing out the main features and market developments in the preceding year, as well as the outlook for the current and next year. It covers overall aspects related to steel supply, demand, trade and capacity, as well as developments in the steel market by area for both OECD and non-OECD countries. It also contains brief analyses and data regarding employment in the steel industry of the OECD countries.

3.3.2 The Iron and Steel Industry in 1989
Sales No. ISNB 92-64-03340-8, Paris, January 1991
Bilingual publication in English and French.

45. This annual report is usually published in December. It is basically a statistical compendium presenting about 30 tables containing data related to the iron and steel industry. Production, consumption and index prices of the raw materials used in iron and steel-making are also presented, mainly for iron ore, manganese ore, coke and ferrous scrap.

3.4 Commission of the European Economic Community - EEC

46. The statistical office of the European Communities, EUROSTAT, located in Luxembourg, publishes regularly detailed statistical information on iron and steel for its 12 member countries. All the following publications are multi-language (seven languages) and can be purchased or obtained through subscription.

3.4.1 Iron and Steel Yearbook - 1990

47. This publication provides yearly statistics on the structure and the economic situation of the Community's iron and steel industry. It includes data on employment, size of enterprises, plants, crude steel, iron and scrap balances, production of iron ore, pig iron, crude steel and finished steel and products, consumption of raw materials, external trade in scrap, etc.

3.4.2 Iron and Steel Monthly - with Quarterly Supplement

48. This publication presents the European Coal and Steel Community (ECSC) steel situation at a glance, including a monthly index of production of the Community's iron and steel industry, pig iron production, production and trade of steel products, as well as consumption and receipts of scrap.

3.4.3 Steel Consumption by User Branch - 1970-1987

49. This publication presents detailed information on steel consumption by different sectors of the economy of the Community's member countries.

3.5 European Free Trade Association - EFTA

50. The EFTA secretariat has not undertaken any major study or published any report concerning iron ore in 1990 or 1991. Its activities on iron ore are limited to financial contributions to the work on "European Standardization for Iron and Steel" which is performed in close cooperation with the European Committee for Standardization (CEN). This financial contribution is related to items where there is a mutual understanding between the Commission of the European Communities and EFTA as to the urgency and relevance for the free trade of steel products.

3.6 Commonwealth Secretariat

51. In 1990, neither the Commonwealth secretariat nor the Commonwealth Fund for Technical Co-operation undertook any studies on iron ore, iron or steel matters. The last project with any bearing on this subject was "Control of Pollution from the Iron Ore Mining Industry in Goa, India", completed in April 1989.

3.7 International Iron and Steel Institute - IISI

52. The IISI, through its seven standing committees, continues to organize meetings and seminars, as well as to undertake major studies and collect and disseminate world steel statistics of high interest to the world iron and steel industry. The IISI Committee on Raw Materials meets regularly; in 1991 it met in June in Brussels, and its 1992 annual meeting is scheduled to take place in New Delhi, India, in February. The Committee examines the short-term and medium-term outlook for steel-related raw material supply and demand, including for iron ore. In this regard, the study on Future World Supplies of Iron Ore, published in 1989, is presently being updated, and its new version might be issued in 1992. Apart from its regular publications, the following studies were issued recently by the IISI:

3.7.1 The Electric Arc Furnace, Brussels, 1990

53. This report focuses on major developments in electric arc furnace steelmaking over the last decade. It presents information on the current operating performances reported by over 40 arc furnaces, and includes technical chapters, among them one related to raw material requirements of the furnaces.

3.7.2 International Competition for the Body in White of the Passenger Car
Brussels, 1990

54. Following the study on International Competition: An Economic Analysis of General Trends mentioned in the 1990 bibliography, this new study analyses the major changes and new requirements of the automotive industry in the light of technological developments in car body manufacturing. It provides a balanced international perspective of the competition between steel and other materials for the automotive industry, which has become one of the key sectors of the economy in most industrialized countries.

3.7.3 Statistics of Eastern Europe and the USSR - State: 1989
Brussels, 1991

55. This publication presents statistical and other information relating to the economies, steel industries and steel markets of Eastern European countries and the USSR. It covers the period from 1970 to 1989. It should be noted that at present China and the Eastern European countries are reporting their monthly statistics of crude steel production to the IISI.

3.8 Latin American Iron and Steel Institute - ILAFA

56. In Latin America the major event for the region's iron ore, iron and steel industry is the Annual Congress of the Latin American Iron and Steel Industry organized by ILAFA. In 1990 the Congress was held in Cancun, Mexico, and its proceedings have been published in Siderurgia Latinoamericana, the monthly technical review of ILAFA. The 1991 congress will take place in Rio de Janeiro, Brazil, from 27 to 30 October. ILAFA also organizes technical seminars, undertakes major studies and regularly publishes detailed statistics from the Latin American iron ore, iron and steel industry. The following are among its most recent publications:

3.8.1 The Latin American iron and steel industry in 1989/90 and its prospects, Santiago, 1990
Bilingual: Spanish and English

57. This annual study analyses the main world economic developments, the situation in each Latin American country, and its linkage with the regional iron and steel industry as regards production, trade, investments and the overall world market situation.

3.8.2 Direct reduction and smelting reduction, Santiago, 1990
In Spanish.

58. This publication contains the proceedings and the technical papers presented at the VI Seminar on Direct Reduction and Smelting Reduction, held under the auspices of ILAFA in Ciudad Guyana, Venezuela, in September 1990.

3.8.3 The iron ore industry in Brazil - 1960-1988, Santiago, 1990
In Spanish.

59. This study presents an overview of the Brazilian iron ore industry covering aspects related to the country's reserves, production, exports, domestic consumption and the performance of the main iron ore mining companies. This is the most recent study of this series, as three other similar studies, mentioned in the previous bibliography, were also undertaken in 1988 and 1989 for the iron ore industry in Argentina, Chile and Venezuela.

3.8.4 Statistical yearbook of steelmaking and iron ore mining in Latin America - 1990, Santiago, April 1991
Bilingual: Spanish and English.

60. This annual publication is now also available on diskettes. The latest edition presents statistical series for the period 1979 1990 for Latin American countries on production and exports of iron ore, steel production by processes, exports and imports of steel products by origin and destination, steel prices, the consumption of steel products and investments made by the Latin American iron and steel industry.

3.9 South-East Asia Iron and Steel Institute - SEASI

61. SEASI is a professional technical institute representing the iron and steel industry in South East Asia. Its main objective is to provide a forum for exchange of knowledge and discussions among Governments, industries and organizations of its members, as well as supporting countries (Australia, Japan and the Republic of Korea). SEASI organizes conferences, seminars and study tours in the region. It publishes monthly newsletters, quarterly journals, and an annual directory. The proceedings and technical papers presented at conferences and seminars are usually published.

3.9.1 Alternative Iron-making Technologies, Manila, 1991
Available in English.

62. This publication is a bound copy of the 26 technical papers presented at the seminar on this subject held in Jakarta, Indonesia, in November 1990. It covers the full spectrum of iron-making processes from pelletizing, pre-treatment of iron ores down to melting. It also contains information about developments relating to blast furnaces, pulverized coal injection, DRI, the COREX process and smelting reduction.

3.10 Arab Iron and Steel Union - AISU

63. AISU's main objective is to facilitate close and effective co-operation between its member countries with a view to furthering the development of the iron and steel industry in the Arab countries. To this end, AISU organizes congresses and seminars and publishes a monthly review, Arab Steel, with technical papers from the various seminars or with other relevant articles.

3.10.1 AISU International Symposium on Direct Reduction

64. This symposium was held in Miserata, Lybiyan Arab Jamahiriya, in December 1990. During this event 13 papers were presented, and discussions centered on technological aspects, as well as the expertise, experience, production and success achieved with direct reduction by some companies in the Arab world, in particular in Qatar, Saudi Arabia and Egypt. Considering the wide availability of natural gas (21 per cent of world reserves) and the lack of coke in the Arab world, the direct reduction route is considered the best alternative for steelmaking in the Middle East. The symposium thus recommended that efforts should be made to develop the iron ores available in the region to meet the requirements of the DRI plants located in Arab countries. Participants recommended that the current studies on the pelletization of Mauritania's iron ores should be completed.

3.11 American Iron Ore Association - AIOA

65. This Association, which represents the iron ore industry of the United States and Canada, does not publish studies or articles on iron ore. However, the AIOA issues a comprehensive collection of detailed iron ore statistics of the iron ore industry in the United States and Canada. The most recent issue in this series is: Iron Ore 1990, Ohio, United States, July, 1991.

## Part II

## RELEVANT STUDIES AND PUBLICATIONS COMMUNICATED BY GOVERNMENTS

Canada

66. The Mineral and Metals Commodities Branch of the Energy, Mines and Resources of Canada issued in 1991 the publication: Canadian Iron Ore Industry Statistics, 1989 (MRI 90/2). This bilingual (English/French) statistical report is a continuation of the Canadian Iron Ore Industry Statistics series developed for the Mineral Information Bulletin and published from 1955 to 1970. In 10 tables, it presents detailed statistical data for the Canadian iron ore industry in 1989.

Chile

67. Under its diversification policy and in the search for higher value-added products, Compania Mineral del Pacifico S.A. (CMP), the only Chilean iron ore producer, undertook a number of studies concerning its iron ore mining activities, including the following:

The production of fluxed pellets at the Huasco Pellets Plant

68. This study was presented in 1989 at the annual meeting of the Society of Mining Engineers of Colorado, United States. It explained the CMP experience in the production of self-fluxing pellets for blast furnaces at its Huasco plants, which thanks to its indurating process of the "Grate kiln" type, has been producing a high quality product since 1978.

Study of vanadium extraction from the iron ore of the Romeral mines

69. A technical and market feasibility study carried out to evaluate the vanadium resources of the Romeral mines indicated that 174,000 tons of vanadium content can be obtained as an iron ore by-product. In view of its existing mining and beneficiation facilities in Romeral, CMP has the capacity to produce this type of mineral at low costs. This places this company in a good position in terms of quality and costs to allow it to be a competitive international vanadium supplier. It is planned to process 500,000 tons of magnetic concentrates of higher grade vanadium for an annual output of about 5,000 metric tons of $V_2O_5$, which represents about 10 per cent of world production.

Pellets for direct reduction

70. This paper was presented at the Sixth ILAFA-IVES seminar held in September 1990 in Venezuela. It describes the modifications made at the pelletizing plants of Compania Minera del Pacifico in order to produce high quality DR pellets.

71. In addition, volume 45, No. 192 of the specialized publication Minerales issued by the Chilean Institute of Mining Engineers contains the following three studies on iron ore:

Geology of the iron deposits in the districts of Los Colorados, El Algarrobo y el Romeral

72. This study presents a compendium of the geology of the iron deposits under exploitation, as well as an evaluation of their Fe grade and its relationship with impurities and oxidation.

The capacity increase of the tailing thickener of the Huasco pellet plant

73. This article presents the results of the technical feasibility studies carried out with a view to increasing the capacity of the only tailing thickener of the pellet plant by changing the design of the existing feedwell system.

Study of the protection of grinding at the Huasco pellets plant

74. This article presents the results of important tests which have been executed with high chrome cast iron balls in the grinding of iron ore at the Huasco pellets plant, as compared with forged balls.

Germany

75. The Government of Germany informed the UNCTAD secretariat that it was difficult to carry out a thorough check on studies dealing with the world iron ore market in the 1980s. Most studies were carried out by the private sector for internal purposes, and consequently were not available to the public. The companies Exploration and Bergbau, Rohstoffhandel, and Erzkontor Ruhr GmbH, carry out studies at regular intervals on future developments in the world iron ore market for their affiliated enterprises. In addition, Erzkontor Ruhr regularly participates in the survey on the future availability of iron ore on the world market which is carried out by the IISI Committee on Raw Materials. (see para. 52). A copy of the study "Prospects for New Iron Ore Development" by C. Siebel, from Exploration und Bergban, presented at the Metal Bulletin's 6th International Iron Ore Symposium, held in April 1989 in Madrid, was forwarded to the UNCTAD secretariat (see Part III).

Ghana

76. The Government of Ghana, through the Minerals Commission and the Ministry of Lands and Natural Resources, provided a summary of studies carried out for the development of the country's iron and steel manufacturing from local iron ore deposits and indigenous reductants.

77. In Ghana there are three main iron ore deposits of potential industrial or commercial importance. For economic reasons, the Oppon-Mansi deposit has been most studied. Feasibility studies carried out in the 1970s indicated reserves of 108 million tons, with an average grade of 39 per cent Fe. About 760,000 tons of ore annually could be mined and upgraded to about 42 per cent Fe. During the 1980s the feasibility report was reviewed, with a view to recommending to the Government the best way to implement the project. It concluded that the technology for iron production should be based on the direct reduction route using natural gas from the western region of the country and upgrading the ore to about 65 per cent Fe. The sponge iron produced would be refined to steel using electric arc furnaces in micro steel plants. More recently, Ghana's Minerals Commission recommended the establishment of a pilot sponge iron plant to investigate whether the development of the country's iron and steel industry should be based on small-scale steel units, in contrast to the large-scale concept proposed in the past. A preparatory assistance document will be undertaken with technical assistance from UNIDO.

Mexico

78. In 1990 two studies were undertaken in Mexico regarding iron ore and iron and steel related issues:

> Analysis of supply/demand of raw materials for direct reduction in Mexico, September 1990.

79. This paper was presented at the VI ILAFA Seminar on Direct Reduction and Smelting Reduction (para. 58) held in Venezuela in September 1990. It highlights the important role of direct reduction for steel production in Mexico, which presently accounts for 47 per cent of total crude steel output. It is important, therefore, to ensure the availability of high quality raw materials. Total iron ore reserves found in Mexico are limited but able to meet the requirements of the country's steel industry for the next 20-25 years. However, the study concludes that in order to achieve this aim, it is necessary to adopt adequate measures to avoid, on the one hand, over-production and, on the other hand, unnecessary imports.

80. Projections of the supply/demand balance for iron ore in Mexico during the 1990s point to a deficit of pellets during the period 1991/1993 in view of the higher level of steel output at Sicartsa II plants. From 1994 onwards, the pellet supply might increase with the operation of the new pelletizing plant, a situation which should prevail up to 1998. In 1999, when the iron ore deposits currently exploited by Hylsa might be depleted, Mexico could face a pellet deficit estimated at 138,000 tons annually. The study also concludes that from 1993 onwards, growing imports of concentrates will be required to feed the Sicartsa II pellet plant, which might reach its full capacity in 1996. Thereafter, imports of concentrates might be reduced by about 50 per cent annually in the light of the investments made to complete the work of the concentration plants. In conclusion, by 1999 the Mexican demand and supply situation for iron ore might be close to equilibrium at a level of between 7.5 and 8.0 million tons a year, as compared to a level of slightly above 6 million tons in 1991.

The modernization of the Mexican iron and steel industry, November 1990

81. This study was presented at the XII National Symposium of the Iron and Steel Industry organized by the Institute of Technology of Morelia in 1990. It reviewed the changes currently taking place in the Mexican iron and steel industry and its prospects. The question of the privatization of the Mexican steel industry was also addressed. In addition, the report stated that during the first half of the 1990s, a process of modernization of the state-owned steel companies will be implemented in order to improve their financial situation and to increase the quality and price competitiveness of the Mexican iron and steel industry on both the internal and the international markets.

Panama

82. The Directorate of Minerals Resources from the Ministry of Commerce and Industry of Panama reported that there have been no studies about production, consumption or trade of iron ore carried out in Panama.

Philippines

83. The Metals Industry Research Development Center of the Philippines is undertaking studies aiming at an expansion of the iron and steel industry of the Philippines. An integrated iron and steel project is envisaged with a view to expanding capacity, increasing product lines, and improving product quality.

Sweden

84. The National Board of Trade of Sweden reported that the studies dealing with iron ore, iron and steel matters undertaken in the country during the last few years, were the following:

Development of the Kiruna mine in the light of the market prospects for the 90's, April 1991.

85. This study was prepared by LKAB for the Metal Bulletin 7th Iron Ore Symposium, held in France in 1991. Recalling that, with the closing of the Dannemora mine at the end of 1991, LKAB will be the only surviving iron ore producer in Sweden, and that the country's share in the world trade of iron ore declined from 15 per cent in the early 1960s to 4 per cent in 1990, LKAB raised the question about the future of its underground Kiruna mine. The company explained that in order to continue operations at Kiruna mine,

investments in modernization and expansion of pelletizing capacity will be necessary. Accordingly, the future supply and demand for iron ore products, as well as LKAB's future supply capability and profitability, were under review. An increase of 1 million tons at the current pelletizing capacity is being considered. In addition, as LKAB benefits from proximity to its ports and to its major European customers, and also produces high quality products, the possibility of building a new pellet plant, with a capacity of up to 4 million tons per year, is under consideration, and if so decided, this new plant could be put into operation in 1994.

Structural changes in the Swedish iron ore and steel industry, 1988

86. This paper was prepared by the Director of the Swedish Steel Producers' Association. It reviews the structural development of the Swedish steel industry, which was founded on the basis of the country's abundant availability of iron ore, charcoal and water power. The question of overcapacity and decreasing profitability of the iron ore and steel industry up to 1987 and the efforts made since then to improve this situation were examined. Regarding the iron ore mining situation in Sweden, it was recalled that, as costs of underground mining were higher than those of open pit mining, LKAB was implementing an ambitious programme using very advanced techniques in order to increase mining productivity and remain competitive. Under this programme, from 1988 to 1992 operational costs would be reduced by approximately 25 per cent in real value. It was concluded that, with higher productivity, the evolution of future freight costs and an increasing share of pellet production, LKAB would remain competitive on the European iron ore market.

Mining in Sweden

87. This study was prepared by the Swedish Mining Association in 1989, and a new issue will be available in August 1991. It reviews the output and exports of Swedish iron ore products from 1980 to 1989 by mines, providing technical and operational details. It also provides information about the production of non-ferrous ores and industrial minerals.

United States

88. The United States Department of the Interior, Bureau of Mines, in May 1991 issued the publication Iron Ore 1989. This report reviews government programmes and legislation relating to iron ore, as well as the situation in respect of employment and productivity in the United States iron ore industry in 1989. It contains detailed information on the country's production, consumption, stocks, transportation and prices. The report also presents an overview of world iron ore capacity, international trade and major developments in selected countries.

Uruguay

89. The Directorate of Mining and Geology from the Ministry of Industry and Energy of Uruguay reported that no studies on iron ore or related matters have been carried out recently in Uruguay.

## Part III

## SUMMARIES ON SPECIFIC TOPICS

### A. Iron ore mining capacity and investments

90. UNCTAD's report Review of the current market situation and outlook for iron ore - 1991 emphasizes that despite the more favourable attitudes towards investment in iron ore mining in 1989-1990, the Gulf events inhibited investment decisions during the second half of 1990. It also recalls that the transition of Eastern European countries from centrally planned to market economies, the liberalisation and privatization in a number of developing countries, and the recent economic reforms taking place in China - all these factors increased the attractiveness of foreign joint ventures. Most of the countries concerned were reviewing their investment codes, mining legislation, foreign exchange mechanisms, etc, in order to attract potential foreign investors. The report considers, however, that investors remain cautious, because iron ore prices are not yet sufficiently attractive to justify sizeable and costly investments. On the other hand, with a view to maintaining the current supply/demand market balance, UNCTAD calls for caution in the development of new projects, in order to avoid another period of over-supply and depressed prices. Annexes I and II of the report show that planned capacity expansions are much higher than effective closures and capacity reductions.

91. The joint study by ECA and UNCTAD on the Iron ore industry in Africa during the 1980s and prospects for the 1990s includes the table presented below (table 1) showing current and planned capacity for the extraction of iron ore in developing countries of Africa. It also examines the enormous financing resources required to maintain Africa's position in the world market for iron ore. It is estimated that in order to develop only the Mifergui project in Guinea, the Faleme project in Senegal, the M'Maoudat project in Mauritania, and the Ligauga project in the United Republic of Tanzania, about $US 1,471 million are needed. Considering the limited possibilities of the African countries already affected by their heavy external debt, this additional financial burden is a major constraint.

Table 1

Iron ore: present and planned capacity in Africa

| Mine | Country | Present capacity (million tons/year) | Planned capacity (million tons/year) | Notes |
|---|---|---|---|---|
| Ouenza Boukmadra | Algeria | 4 | - | - |
| Kassinga | Angola | - | - | Since 1986 rehabilitation efforts to re-open the mine, but reserves might be depleted after re-opening. |
| Baharia | Egypt | 3.3 | - | - |
| Nimba | Guinea | - | 10 | Initial production: 6-7.5 MT/y can start in 1992 |
| Nimba Tokaseh | Liberia | 3 | 2 | Exploitation started in 1963. Installed capacity: 10 million, but current capacity 3 million MT/y. Depletion of reserves in 1992/93. Exploitation of Nimba Ouneen 2 million MT/y extracted from Tokaseh under the Mifergui project. |
| Massif de Bong | Liberia | 7.2 | - | Started in 1965 and may continue until 2004 due to the rehabilitation programme financed by the EEC. |
| Soalala | Madagascar | - | 3 | Production oriented to world exports |
| Kedia D'Iajil | Mauritania | 12 | - | Production started in 1960, and reserves might be depleted by 2007 |
| The Guelbs | Mauritania | 6 (1st phase) | 12 (2nd phase) | Envisaged production capacity at the first phase: 6 million (financial and technical problems). Actual production: 3 million. 2nd phase delayed. Priority given to the development of M'Haoudat. |
| M'Haoudat | Mauritania | - | 6 | Production will gradually replace the extraction from the Kedia deposits |
| Itakpe | Nigeria | - | 4 | Production for the Ajaskuta steel works. |
| Faleme | Senegal | - | 8 - 10 | Major obstacle is the high costs for infrastructure. (US$ 776 million) |
| Marampa | Sierra Leone | 1 | - | Mine closed since 1985 for economic reasons. Efforts to maintain installations and re-open the mine. |
| Ripple Creekand Buctiwa | Zimbabwe | 1 to 1.5 | - | Production to be consumed at Zisco steel works. |

Source: United Nations Economic Commission for Africa.

92. In the study Prospects for New Iron Ore Development made in Germany in 1989, total iron ore capacity in the Western world was forecast as reaching 609 million tons in 1990 and 613 millions in 1995; the increase of 23 million tons in relation to 1988 was mainly for fines, whereas the capacities for pellets and lumps were expected to remain fairly constant, as shown in table 2 below.

Table 2

Projected development of iron ore capacities by product (Western world)
(Million tons)

| Years | 1988 | 1990 | 1995 |
|---|---|---|---|
| Pellets | 150 | 153 | 153 |
| Lumps | 130 | 131 | 129 |
| Fines Concentrate Pelletfeed | 310 | 325 | 331 |
| Total | 590 | 609 | 613 |

Source: C. Siebel, 1989.

93. According to the Iron Ore report of the United States Bureau of Mines, in 1989 the world iron ore pelletizing capacity by continent and country was as indicated in table 3 below.

Table 3

Iron ore: World pelletizing capacity, by continent and country

| | Number | | | Rated capacity (million metric tons, gross weight) |
|---|---|---|---|---|
| | Sites | Plants | Units | |
| North America: | | | | |
| Canada | 5 | 6 | 13 | 26.44 |
| Mexico | 5 | 6 | 6 | 9.50 |
| United States | 10 | 18 | 50 | 66.55 |
| Total | 20 | 30 | 69 | 102.49 |
| South America: | | | | |
| Argentina | 1 | 1 | 4 | 1.00 |
| Brazil | 3 | 8 | 8 | 24.30 |
| Chile | 1 | 1 | 1 | 4.00 |
| Peru | 1 | 2 | 2 | 3.20 |
| Venezuela | 1 | 1 | 2 | 6.60 |
| Total | 7 | 13 | 17 | 39.10 |
| Europe: | | | | |
| Belgium-Luxembourg | 1 | 1 | 1 | .80 |
| Czechoslovakia | 1 | 1 | 1 | .25 |
| Netherlands | 1 | 1 | 1 | 3.80 |
| Norway | 2 | 3 | 3 | 3.20 |
| Sweden | 3 | 3 | 4 | 10.40 |
| Turkey | 1 | 1 | 1 | 1.30 |
| USSR | 7 | 13 | NA | 80.00 |
| Yugoslavia | 1 | 1 | 1 | .60 |
| Total | 17 | 24 | NA | 100.35 |
| Africa: | | | | |
| Liberia | 1 | 1 | 1 | 3.00 |
| Morocco | 1 | 1 | 1 | .35 |
| Nigeria | 1 | 1 | 1 | 1.45 |
| South Africa | 1 | 1 | 1 | .60 |
| Total | 4 | 4 | 4 | 5.90 |
| Asia: | | | | |
| Bahrain | 1 | 1 | 1 | 4.00 |
| China | 4 | 4 | NA | 2.50 |
| India | 1 | 1 | 1 | 2.00 |
| Iran (Islamic Rep. of) | 1 | 1 | 1 | 2.50 |
| Japan | 1 | 2 | 2 | 4.40 |
| Total | 8 | 9 | NA | 15.40 |
| Oceania: Australia | 2 | 2 | 6 | 4.00 |
| World total | 58 | 82 | NA | 267.24 |

NA = Not available
Source: Iron Ore Minerals Yearbook - 1989, US Bureau of Mines.

B. Evolution of demand and supply of iron ore or steel

94. Regarding the outlook for steel, the OECD report on "The Steel market in 1990 and the Outlook for 1991" shows, in particular, that after four consecutive years of increase, apparent steel consumption in the OECD area will probably decline modestly in 1991. Net exports to the rest of the world will continue to decline slightly, as will crude steel production for the OECD area.

95. Commenting on the outlook for iron ore, UNCTAD, in its "Review of the current market situation and outlook for iron ore - 1991", considers that from 1992 world steel demand is expected to start rising again, although it might only be in 1993/1994 that a good recovery is likely to take place. This will have a positive effect on the iron ore market.

96. In all the other studies listed in this bibliography, no particular consideration is given to the future evolution of supply and demand of iron ore or steel for 1992 onwards.

Annex

DIRECTORY OF RELEVANT INTERNATIONAL ORGANIZATIONS

For inquiries and acquisition of the publications listed in this bibliography, please contact directly the concerned organizations:

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